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ART UNIT	PAPER NUMBER
2187	

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Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
Office Action Summary		10/808,232	ZOHAR ET AL.
		Examiner	Art Unit	
		Hashem Farrokh	2187	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>24 March 2004</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-42</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-3,5-22 and 24-42</u> is/are rejected.

7) ☒ Claim(s) <u>4 and 23</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>24 March 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>3/24/04</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

The instant application having application No. 10/808,232 has a total of 42 claims

pending in the application; there are 12 independent claims and 30 dependent claims,

all of which are ready for examination by the examiner.

Specification

Applicant is reminded of the proper language and format for an abstract of the
disclosure.

The abstract should be in narrative form and generally limited to a <u>single
paragraph on a separate sheet within the range of 50 to 150 words.</u> It is important that
the abstract not exceed 150 words in length since the space provided for the abstract
on the computer tape used by the printer is limited. The form and legal phraseology
often used in patent claims, such as "means" and "said," should be avoided. The
abstract should describe the disclosure sufficiently to assist readers in deciding whether
there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information

given in the title. It should avoid using phrases which can be implied, such as, "The

disclosure concerns," "The disclosure defined by this invention," "The disclosure

describes," etc.

INFORMATION CONCERNING CLAIMS:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claims 1-3, 8-9, 11-13,15, 18, 20-22, 27-28, 30-32, 34-35, 37, and 39-42 are

rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,405,284 B1

to Bridge.

1.   In regard to claim 1 Bridge teaches:

A method for storing data **(e.g., abstract)**, comprising:

"distributing a first plurality of groups of logical addresses among one or more storage

devices;" **(e.g., column 30, lines 50-54).**

"receiving a second plurality of data-sets containing the data to be stored;" **(e.g.,**

column 27, line 35).

"assigning each data-set among the plurality of data-sets a number chosen from a first

plurality of different numbers;" **(e.g., column 6, lines 47-51; Data Extents 124-128 in**

Fig. 1).

"partitioning each data-set into multiple partitions, so that each partition among the

multiple partitions receives a sequential partition number;" **(e.g., column 6, lines 42-**

56).

"assigning each partition within each data-set to be stored at a specific group of logical

addresses in accordance with the sequential partition number of the partition and the

number assigned to the data-set;" **(e.g., column 8, lines 62-67; column 10, lines 44-**

52; Fig. 4).

"and storing each partition at the assigned specific group of logical addresses." **(e.g., column 4, lines 60-63).**

2.   *In regard to claim 8 Bridge teaches:*

"A method for data distribution **(e.g., abstract)**, comprising: receiving at least part of a data-set containing data;" **(e.g., column 27, line 35).**

"delineating the data into multiple partitions;" **(e.g., column 4, lines 50-54).**

"distributing logical addresses among an initial set of storage devices so as to provide a balanced access to the devices;" **(e.g., column 30, lines 50-54).**

"transferring the partitions to the storage devices in accordance with the logical addresses;" **(e.g., column 7, lines 50-55).**

"adding an additional storage device to the initial set **(e.g., column 22, lines 29-32; Fig. 16)**, thus forming an extended set of the storage devices comprising the initial set and the additional storage device;" **(e.g., column 31, lines 1-5; claim 32).**

"and redistributing the logical addresses among the storage devices in the extended set so as to cause a portion of the logical addresses and the partitions stored thereat to be transferred from the storage devices in the initial set to the additional storage device **(e.g., column 31, lines 3-5)**, while maintaining the balanced access and without requiring a substantial transfer of the logical addresses among the storage devices in the initial set." **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

3.   *In regard to claim 12 Bridge teaches:*

"A method for data distribution **(e.g., abstract)**, comprising:"

"receiving at least part of a data-set containing data;" **(e.g., column 27, line 35).**

"delineating the data into multiple partitions;" **(e.g., column 4, lines 50-54).**

"distributing logical addresses among an initial set of storage devices so as to provide a balanced access to the devices;" **(e.g., column 30, lines 50-54).**

"transferring the partitions to the storage devices in accordance with the logical addresses;" **(e.g., column 7, lines 50-55).**

"removing a surplus storage device from the initial set, thus forming a depleted set of the storage devices comprising the initial set less the surplus storage device;" **(e.g., column 5, lines 6-7).**

"and redistributing the logical addresses among the storage devices in the depleted set so as to cause the logical addresses of the surplus device and the partitions stored thereat to be transferred to the depleted set, while maintaining the balanced access and without requiring a substantial transfer of the logical addresses among the storage devices in the depleted set." **(e.g., column 30, lines 60-67 to column 31, lines 1-5).**
Bridge teaches that when a disk drive removed (or added), it changes the configuration of the storage system. Data is dynamically moved to remaining or depleted storage devices to provide load balancing (e.g., see column 3, lines 16-18).

4.   *In regard to claim 16 Bridge teaches:*

"A data storage system **(e.g., Fig. 1)**, comprising: one or more mass-storage devices **(e.g., Disk Group 104 in Fig. 1)**, coupled to store partitions of data at respective first ranges of logical addresses (LAs);" **(e.g., column 5, 56-62; lines column 9, lines 36-43; Fig. 3)**. For example directories in each "root disk group" contain information including logical volume addresses and pointer that identifies the extents or partitions.

"a plurality of interim devices **(e.g. Disk Drives 106-114 in Fig. 1)**, configured to operate independently of one another **(e.g., column 12, lines 12-14**, each interim device being assigned a respective second range of the LAs and coupled to receive the partitions of data from and provide the partitions of data to the one or more mass-storage devices having LAs within the respective second range;" **(e.g., column 9, lines 4-10; extent B in disk drive 214 in Figs. 2A-2B)**. The logical volume or the logical address space is portioned to a plurality of extends. For example extents A-D addresses the stripes in disk drive 214-218 in Fig. 2A.

"and one or more interfaces **(e.g., column 6, lines 20-22; Fig. 1)**, which are adapted to receive input/output (IO) requests from host processors **(e.g., column 5, lines 33-34)**, to identify specified partitions of data in response to the IO requests, to convert the IO requests to converted-IO-requests directed to specified LAs in response to the specified partitions of data, and to direct all the converted-IO-requests to the interim device to which the specified LAs are assigned." **(e.g., column 5, lines 56-62; column 9, lines 36-38)**.

5.   *In regard to claim 20 Bridge teaches:*

"A data storage system **(e.g., Fig. 19)**, comprising: one or more storage devices

wherein are distributed a first plurality of groups of logical addresses;" **(e.g., column 30,**

lines 50-54).

"and a processing unit which is adapted to: receive a second plurality of data-sets

containing the data to be stored **(e.g., column 27, line 35)**, assign each data-set among

the plurality of data-sets a number chosen from a first plurality of different numbers,

partition each data-set into multiple partitions **(e.g., column 4, lines 50-54)**, so that

each partition among the multiple partitions receives a sequential partition number **(e.g.,**

Extents A-D and Stripes A0:A3-D0:D3 in Figs 2A-2B), assign each partition within

each data-set to be stored at a specific group of logical addresses in the one or more

storage devices in accordance with the sequential partition number of the partition and

the number assigned to the data-set, and store each partition in the one or more

storage devices at the assigned specific group of logical addresses." **(e.g., column 9,**

lines 4-17).

6.   *In regard to claim 27 Bridge teaches:*

"Data distribution apparatus **(e.g., Fig. 19)**, comprising: an initial set of storage devices

among which are distributed logical addresses so as to provide a balanced access to

the devices;" **(e.g., column 23, lines 49-55).**

"an additional storage device to the initial set **(e.g., column 22, lines 29-32; Fig. 16)**,

thus forming an extended set of the storage devices comprising the initial set and the

additional storage device;" **(e.g., column 31, lines 1-5; claim 32).**

"and a processor **(e.g., Processor 1904 in Fig. 19)** which is adapted to receive at least

part of a data-set containing data **(e.g., column 27, lines 34-35)**, to delineate the data

into multiple partitions **(e.g., column 4, lines 50-54)**, to transfer the partitions to the

initial set of storage devices in accordance with the logical addresses **(e.g., column 7,

lines 50-55)**, to redistribute the logical addresses among the storage devices in the

extended set so as to cause a portion of the logical addresses and the partitions stored

thereat to be transferred from the storage devices in the initial set to the additional

storage device **(e.g., column 28, lines 40-49)**, while maintaining the balanced access

and without requiring a substantial transfer of the logical addresses among the storage

devices in the initial set." **(e.g., column 9, lines 4-12; column 23, lines 49-55).**

7.   *In regard to claim 31 Bridge teaches:*

"Data distribution apparatus **(e.g., Fig. 19)**, comprising: an initial set of storage devices

among which are distributed logical addresses so as to provide a balanced access to

the devices;" **(e.g., see abstract; column 8, lines 38-39).**

"a depleted set of storage devices, formed by subtracting a surplus storage device from

the initial set;" **(e.g., column 5, lines 6-7).**

"and a processor which is adapted to receive at least part of a data-set containing data

(e.g., column 27, line 35), to delineate the data into multiple partitions **(e.g., column 4,**

lines 50-54), to transfer the partitions to the initial set of storage devices in accordance with the logical addresses **(e.g., column 7, lines 50-55)**, to redistribute the logical addresses and the partitions stored thereat of the surplus storage device among the storage devices in the depleted set while maintaining the balanced access and without requiring a substantial transfer of the logical addresses among the storage devices in the depleted set." **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

8.   *In regard to claim 35 Bridge teaches:*

"A method **for** storing data **(e.g., abstract)**, comprising:"

"coupling one or more mass-storage devices to store partitions of data at respective first ranges of logical addresses (LAs);" **(e.g., column 5, 56-62; lines column 9, lines 36-43; Fig. 3).**

"configuring a plurality of interim devices to operate independently of one another;" **(e.g. Disk Drives 106-114 in Fig. 1)**

"assigning each interim device a respective second range of the LAs;" **(e.g., column 9, lines 4-10; extent B in disk drive 214 in Figs. 2A-2B).**

"coupling each interim device to receive the partitions of data from and provide the partitions of data to the one or more mass-storage devices having LAs within the respective second range;" **(e.g., column 9, lines 4-10; extent B in disk drive 214 in Figs. 2A-2B).**

"receiving input/output (IO) requests from host processors;" **(e.g., column 27, lines 28-37).**

"identifying specified partitions of data in response to the IO requests;" **(e.g., column 5, lines 56-62; column 9, lines 36-38).**

"converting the IO requests to converted-IO-requests directed to specified LAs in response to the specified partitions of data;" **(e.g., column 9, lines 36-42).**

"and directing all the converted-IO-requests to the interim device to which the specified LAs are assigned." **(e.g., column 9, lines 44-50).**

9. *In regard to claim 39 Bridge teaches:*

"A method for data distribution **(e.g., abstract)**, comprising:"

"receiving at least part of a data-set containing data;" **(e.g., column 27, line 35).**

"delineating the data into multiple equal size partitions;" **(e.g., column 4, lines 50-54).**

"transferring the partitions to an initial set of storage devices so as to provide a balanced access to the devices;" **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

"adding an additional storage device to the initial set **(e.g., column 22, lines 29-32; Fig. 16)**, thus forming an extended set of the storage devices comprising the initial set and the additional storage device;" **(e.g., column 31, lines 1-5; claim 32).**

"and redistributing the partitions among the storage devices in the extended set so as to cause a portion of the partitions to be transferred from the storage devices in the initial

set to the additional storage device, while maintaining the balanced access and without

requiring a substantial transfer of the partitions among the storage devices in the initial

set." **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

10.   *In regard to claim 40 Bridge teaches:*

"A method for data distribution **(e.g., abstract)**, comprising:"

"receiving at least part of a data-set containing data;" **(e.g., column 27, line 35).**

"delineating the data into multiple equal size partitions;" **(e.g., column 3, lines 24-30).**

"transferring the partitions to an initial set of storage devices so as to provide a balanced

access to the devices;" **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

"removing a surplus storage device from the initial set, thus forming a depleted set of

the storage devices comprising the initial set less the surplus storage device;" **(e.g.,**

column 5, lines 6-7).

"and redistributing the partitions stored in the surplus device to the depleted set, while

maintaining the balanced access and without requiring a substantial transfer of the

partitions among the storage devices in the depleted set." **(e.g., column 7, lines 50-55;**

column 23, lines 49-55).

11.   *In regard to claim 41 Bridge teaches:*

"Data distribution apparatus **(e.g., Fig. 19)**, comprising: an initial set of storage devices;"

"an additional storage device to the initial set, thus forming an extended set of the

storage devices comprising the initial set and the additional storage device;"

"and a processor which is adapted to receive at least part of a data-set containing data,

to delineate the data into multiple equal size partitions **(e.g., column 3, lines 24-30)**, to

transfer the partitions to the initial set of storage devices so as to provide a balanced

access to the initial set of storage devices **(e.g., column 7, lines 50-55; column 23,**

lines 49-55), to redistribute the partitions among the storage devices in the extended

set so as to cause a portion the partitions stored in the initial set to be transferred to the

additional storage device, while maintaining the balanced access and without requiring

a substantial transfer of the partitions among the storage devices in the initial set." **(e.g.,**

column 7, lines 50-55; column 23, lines 49-55).

12.   *In regard to claim 42 Bridge teaches:*

"Data distribution apparatus **(e.g., Fig. 19)**, comprising:"

"an initial set of storage devices;" **(e.g., column 15, lines 60-61)**. For example initial

disk group.

"a depleted set of storage devices, formed by subtracting a surplus storage device from

the initial set;" **(e.g., column 5, lines 6-7).**

"and a processor which is adapted to receive at least part of a data-set containing data

(e.g., column 27, line 35), to delineate the data into multiple equal size partitions **(e.g.,**

column 4, lines 50-54), to transfer the partitions to the initial set of storage devices so

as to provide a balanced access to the initial set of storage devices **(e.g., column 7, lines 50-55; column 23, lines 49-55)**, to redistribute the partitions of the surplus storage device among the storage devices in the depleted set while maintaining the balanced access and without requiring a substantial transfer of the partitions among the storage devices in the depleted set." **(e.g., column 7, lines 50-55; column 23, lines 49-55).**

13.   *In regard to claims 2 and 21 Bridge teaches:*

"wherein the multiple partitions comprise equal size partitions." **(e.g., column 3, line 30).**

14.   *In regard to claims 3, 9, 13, 22, 28, and 32 Bridge teaches:*

"wherein the data-sets comprise data from at least one of a file, file meta-data, a storage object, a data packet, a video tape, a music track, an image, a database record, contents of a logical unit, and an email." **(e.g., see column 6, lines 39-46).**

15.   *In regard to claims 11 and 15 Bridge teaches:*

"wherein distributing the logical addresses comprises: generating a first plurality of sets of logical addresses, and wherein delineating the data comprises: assigning the at least part of the data-set a number chosen from a first plurality of different numbers;" **(e.g., column 9, lines 36-50; 3).**

"and assigning each partition among the multiple partitions a sequential partition number, and wherein transferring the partitions comprises **(e.g., column 31, lines 4-6):**

storing each partition at one of the sets of logical addresses in accordance with the

sequential partition number of the partition and the number." **(e.g., column 9, lines 4-**

16; Fig. 2B). *For example address of logical volume include extents A-D which is*

further partitioned to sequential partitions A0:A3 to D0:D3.

16.   In regard to claims 18 and 37 Bridge teaches:

"wherein the one or more mass-storage devices are coupled to provide a balanced

access to the first ranges of LAs." **(e.g., column 5, lines 56-62; column 9, lines 36-43;**

Fig. 3). For example directories in each "root disk group" contain information including

logical volume addresses and pointer that identifies the extents or partitions.

17.   In regard to claims 30 and 34 Bridge teaches:

"wherein the logical addresses comprise a plurality of sets of logical addresses, and

wherein the processor **(Processor 1904 in Fig. 19)** is adapted to: assign the at least

part of the data-set a number chosen from a plurality of different numbers, assign each

partition among the multiple partitions a sequential partition number, and store each

partition at one of the sets of logical addresses in accordance with the sequential

partition number of the partition and the number." **(e.g., column 9, lines 4-16; Fig. 2B).**

For example address of logical volume include extents A-D which is further partitioned

to sequential partitions A0:A3 to D0:D3.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 10, 14, 19, 24, 29, 33, and 38 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Bridge in view of U.S. Patent Publication No. 2002/0099797 A1

to Merrell et al. (hereinafter Merrell).

18.   In regard to claims 5, 10, 14, 19, 24, 29, 33, and 38 Bridge teaches all limitations

included in the base claims but does not teach: "wherein the one or more storage

devices are operative in at least one of a storage area network, a network attached

storage system, and an object storage architecture."

Merrell teaches: "wherein the one or more storage devices are operative in at

least one of a storage area network, a network attached storage system, and an object

storage architecture." **(e.g., paragraph 10 in pages 1 to 2)** for using Storage Area

Network (SAN).

Disclosures by Bridge and Merrell are analogous because both related to storage

Systems.

At the time of invention it would have been obvious to a person of ordinary skill in art to

modify the storage system taught by Bridge to be utilized as the Storage Area Network

disclosed by Merrell.

The motivation for using the SAN as taught by paragraph 10, pages 1-2 of Merrell is to enhance security and efficiency of the file storage system.

Therefore, it would have been obvious to combine teaching of Merrell with Bridge to obtain the invention as specified in the claims.

Claims 6-7 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridge in view of U.S. Patent Publication No. 2003/0005256 A1 to Grossman et al. (hereinafter Grossman).

19.   In regard to claims 6 and 25 Bridge teaches all limitations included in the base claims but does not expressly teach: "wherein the number is chosen by a randomizing function."

Grossman teaches: "wherein the number is chosen by a randomizing function." **(e.g., see claim 10 in page 5)** *for generating Short-Quasi-Unique-Identifier (SQUID) randomly for identifying object in memory.*

Disclosures by Bridge and Grossman are analogous because both related to the pointers or means to identify data or objects in storage or memory devices.

At the time of invention it would have been obvious to a person of ordinary skill in art to modify the storage system taught by Bridge to include the random generation of SQUID (identifier) disclosed by Grossman.

The motivation for using the SQUID as taught by paragraph 18, page 2 of Grossman is to provide a memory object identifier that are shorter than UID, comprising only a small number of bits, while still providing similar functionality.

Therefore, it would have been obvious to combine teaching of Grossman with Bridge to obtain the invention as specified in the claim.

20.   *In regard to claims 7 and 26 Bridge teaches all limitations included in the base claims but does not expressly teach:* "wherein the number is chosen by a consistent hashing function."

Grossman *teaches:* "wherein the number is chosen by a consistent hashing function." **(e.g., see claim 11 in page 5)** *for generating Short-Quasi-Unique-Identifier (SQUID) by hashing for identifying object in memory. The motivation for combining is based on the same rational given in rejection of claims 6 and 25.*

Claims 17 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridge in view of U.S. Patent Publication No. 2003/0221063 A1 to Eguchi et al. (hereinafter Eguchi).

21.   *In regard to claims 17 and 36 Bridge teaches all limitations included in the base claims but does not expressly teach:* "wherein at least one of the mass-storage devices has a slow access time, and wherein at least one of the interim devices has a fast access time."

Eguchi teaches: "wherein at least one of the mass-storage devices has a slow

access time **(e.g., HDD ID 1 in Fig. 8)**, and wherein at least one of the interim devices

has a fast access time." **(e.g., see paragraph 62 in page 5; HDD K in Fig. 8)** *for*

determining the performance of the parity groups based on the performance of physical

drive set.

Disclosures by Bridge and Eguchi are analogous because both related to the storage

systems.

At the time of invention it would have been obvious to a person of ordinary skill in art to

modify the storage system taught by Bridge to determine the performance of group

parity based physical drive set as disclosed by Eguchi.

The motivation for using the parity group based on the drive performance as taught by

paragraph 17, page 2 of Eguchi is to be able to relocate data between different storage

subsystems in a manner transparent to the host system.

Therefore, it would have been obvious to combine teaching of Eguchi with Bridge to

obtain the invention as specified in the claim.

ALLOWABLE SUBJECT MATTER

Claims 4 and 23 are objected to as being dependent upon rejected based claims,

but would be allowable if rewritten in correct and independent form including all of the

limitations of the base claim and any intervening claims.

1.   The primary reason for allowance of claim 4 in instant application is the

combination with the inclusion of following limitations: **wherein the first plurality of**

**groups comprises s groups each having a different integral group number
between 1 and s, wherein the number comprises an integer r randomly chosen
from and including integers between 0 and s-1, wherein the sequential partition
number comprises a positive integer p, and wherein the group number of the
assigned specific group is (r+p)modulo(s) if (r+p)modulo(s).noteq.0, and s if
(r+p)modulo(s)=0.**

: _IMPORTANT NOTE_ :

_I f the applicant should choose to rewrite the independent claims to include the
limitations recited in either one of the claims, the applicant is encouraged to **amend the
title of the invention** such that it is descriptive of the invention as claimed as required
be sec. **606.01** of the **MPEP**. Furthermore, the **summary of invention** and the **abstract**
should be amended to bring them into harmony with the allowed claims as required by
paragraph 2 of **sec. 1302.01** of the **MPEP**._

_As allowable subject matter has been indicated, applicant's response must either
comply with all formal requirements or specifically traverse each requirement not
compiled with. See **37 C.F.R. § 1.111(b)** and **§ 707.07(a) of the M.P.E.P.**_

Conclusion

The prior art made of record and not relied upon are as follows:

_1.   U. S. Patent No. 5,615,352 A to Jacobson et al. describes Methods for adding
storage disks to a hierarchic disk array while maintaining data availability._

2.   *U. S. Patent No. 6,000,010 A to Legg describes Method of increasing the storage capacity of a level five RAID disk array by adding, in a single step, a new parity block and N--1 new data blocks which respectively reside in a new columns, where N is at least two.*

3.   *U. S. Patent No. 6,901,480 B2 to Don et al. describes Method and apparatus for reconfiguring striped logical devices in a disk array storage.*

*Any inquiry concerning this communication should be directed to Hashem Farrokh whose telephone number is (571) 272-4193. The examiner can normally be reached Monday-Friday from **8:00 AM to 5:00 PM.***

If attempt to reach the above noted Examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Donald A Sparks, can be reached on (571) 272-4201. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBS) at 866-217-9197 (toll-free).

HF

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